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AMENDMENTS TO THE SPECIFICATION

Please substitute the following paragraphs for those which appear at page 5, lines 22 through page 6, line 19 as follows:

Associated with the mounting device 11 are a system 13 for supplying controlled atmospheres upstream and downstream of the sample being tested, and a system 15 for monitoring the beta-particle radioactivity of a gaseous stream exiting the device 11 and interpreting the signals generated to calculate the permeation rate through the film or other sample at that instant. The arrangement is such that the overall sensitivity is sufficient to detect and measure permeation rates of radioactive gaseous compounds of less than 0.0001 gm/m²/day, for example, of moisture as low as 10^{-5} to 10^{-6} gm/m²/day and of oxygen as low as 10^{-5} to 10^{-6} cc/m²/day.

The illustrated mounting device 11 includes upper and lower halves or parts 17, 19. These two parts interface with each other to provide a central receptacle or chamber 21, which in the illustrated device is a shallow, generally square region designed for centrally mounting a square, flat, thin sample 23 for which permeation is to be determined. Accordingly, the central receptacle 21 is formed by a pair of facing shallow cavities 25a, 25b provided in the undersurface of the upper part 17 and the top surface of the lower part 19, which are each only about 0.04 in. (0.1 cm) thick. Immediately surrounding each of these cavities is a groove 27 of square outline that defines the surface area of a film that will be exposed to the controlled atmosphere. The groove 27 is preferably rectangular or square in cross section and accommodates a sealing ring 29 of resilient material that extends outward past the respective surface. Preferably sealing- or O-rings 29 of square or rectangular cross section are placed in each of these grooves 27 so that, when the upper and lower parts 17, 19 are clamped or otherwise pressed together, the sealing rings 29 seal against the thin film 23 through which permeation is to be measured. As a result, the flat film then essentially splits the central receptacle 21 horizontally into a lower upstream subchamber 31 and an upper downstream subchamber 33. The square outline of the facing grooves is proportioned to expose a 3.5 inch (9 cm) square of film composite. The size of the downstream subchamber 31, 33 is minimized so

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as to have a volume of not more than about 10 cc. It has been found that, by minimizing the size of this chamber, by using only a very slow flow of dry gas, such as methane, as a carrier (i.e., a flow of not greater than about 1.5 liters/hour) and by confining the beta-particle radiation monitor to a chamber of small volume, high sensitivity of measurement can be achieved.

Please change the paragraph that begins at page 9, line 11, to read as follows:

During normal testing, the ball valve connector 77 direct flows from the exit conduit 73 straight through to the conduit 78 leading to a monitoring chamber 79, which contains a beta-particle monitor, a commercial component that is disposed in a cylindrical chamber of small volume, i.e., preferably not greater than about 2 liters. Tritium emits beta particles, and the ionization detector in such a small chamber will effectively monitor the amount of radioactivity exhibited by the permeated tritium. It has been found that the minimization of the volume of the downstream subchamber, i.e., not more than 10 cc, and the use of a very low flow of carrier gas, e.g. about 1 L of dry methane per hour, in combination with a small volume radiation monitoring chamber, e.g. about 2 liters, provide sufficient sensitivity to be able to achieve measurement levels less than 0.0001 gm/m²/day, e.g., as low as about 10^{-6} to 10^{-5} gm/m²/day. The ionization detector in the chamber 97 ~~79~~ creates signals in response to the beta particle radiation and sends these signals to an interconnected counter which in turn sends signals to a CPU conversion unit 95. Such a detector in this small volume cylindrical chamber is effective to detect an amount of radiation as low as about 0.1 microcurie per m³, and of course, the size of the chamber is a very small fraction of a cubic meter. The signal processing is described hereinbelow. An outlet 81 from the opposite or exit end of the cylindrical radiation monitoring chamber 97 leads to a conduit network 83 that includes a desiccant dryer 85 which will remove and accumulate all HTO that permeated during the test and found its way into the carrier gas flow through the downstream subchamber 33 of the mounting device 11. Then the methane, stripped of all its radioactivity in the desiccant dryer 85, is vented through a suitable vent line 87. The overall gas supply network 13 also includes a second conduit 89 leading from the pressure regulator 63 to the vent line

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87 through a check valve which serves as a safety bypass should, for some unknown reason, undesired high gas pressure reach the downstream side of regulator.